WHAT IS CLAIMED IS:

1. A linear motor apparatus having a coil array of plural phases of coils and a magnet relatively movable to said coil array, comprising:

plural drivers, at least one of which being provided for each phase, to feed a current to all the same phase coils of said coil array;

measurement means for measuring a change of relative position of said magnet moved by said current to said coil array; and

a controller to determine the polarity of the current applied to the same phase coils based on the change of the relative position measured by said measurement means, and apply a drive current to drive said magnet in a desired direction to the same phase coils.

2. The linear motor apparatus according to claim 1, wherein said controller controls said plural drivers to apply plural drive currents with a phase difference to the coils.

3. The linear motor apparatus according to claim 1, wherein said coil array and said drivers are connected with each other in such a manner that the polarity of the current can be inverted by each same phase coil.

4. The linear motor apparatus according to claim 1, wherein said controller controls said driver based on measurement by said measurement means, and applies a drive current to the same phase coils selected from plural phases.

5. The linear motor apparatus according to claim 1, wherein after first settling of said magnet by a first current to first same-phase coils, said measurement means measures the position of second settling of said magnet driven by a second current to second same-phase coils,

and wherein said controller sets a first phase angle to said first same-phase coils and a second phase angle to said second same-phase coils as phase angle information to specify a current position of said magnet, based on the position of the second settling measured by said measurement means.

6. The linear motor apparatus according to claim 5, wherein said controller applies a drive current to drive said magnet in a predetermined direction to said first same-phase coils or said second same-phase coils, based on said phase angle information.

7. A stage apparatus having:

a movable unit; and

a linear motor apparatus to drive said movable unit for positioning in a predetermined position,

wherein said linear motor apparatus having a coil array of plural phases of coils and a magnet relatively movable to said coil array, comprising:

plural drivers, at least one of which being provided for each phase, to feed a current to all the same phase coils of said coil array;

measurement means for measuring a change of relative position of said magnet moved by said current to said coil array; and

a controller to determine the polarity of the current applied to the same phase coils based on the change of the relative position measured by said measurement means, and apply a drive current to drive said magnet in a desired direction to the same phase coils.

8. An exposure apparatus having:

a reticle stage holding a reticle, to drive the reticle to a predetermined position thereby positioning the reticle in a predetermined position;

a substrate stage holding a substrate, to drive the substrate to a predetermined position thereby positioning the substrate in a predetermined position;

a linear motor apparatus to drive said reticle stage and/or said substrate stage; and

a projection optical system to project a pattern of said reticle on said substrate,

wherein said linear motor apparatus, having a coil array of plural phases of coils and a magnet relatively movable to said coil array, comprising:

plural drivers, at least one of which being provided for each phase, to feed a current to all the same phase coils of said coil array;

measurement means for measuring a change of relative position of said magnet moved by said current to said coil array; and

a controller to determine the polarity of the current applied to the same phase coils based on the change of the relative position measured by said measurement means, and apply a drive current to drive said magnet in a desired direction to the same phase coils.